

L133,870



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PATENT SPECIFICATION

NO DRAWINGS

L133,870

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COMPLETE SPECIFICATION

Liquid Detergent Compositions

ERRATA

SPECIFICATION No. 1,133,870

Page 1, line 30, for "for" read "form"
 Page 3, line 31, for "alkanolamines" read
 "alkanolamides"
 Page 6, Table IV (Heading 21), for "38"
 read "28"
 Page 9, line 17, for "alllowed" read
 "allowed"

THE PATENT OFFICE
 23rd December 1968

20 detergency and simultaneously provide for
 the deposition of a certain amount of oily
 material. Typical examples thereof are com-
 25 posite bubble bath/bath oil compositions and
 composite shampoo/hair conditioning compo-
 sitions. The basic distinction between these
 two typical examples lies in the proportion of
 oil. This duality of properties is due to the
 fact that the compositions contain an oily
 30 layer and an aqueous layer and for temporary
 oil-in-water emulsions when shaken. The
 aqueous layer contains a foaming organic
 detergent, as well as an emulsion destabilizer,
 so that it functions as a cleansing and foam-
 35 producing component. The oily layer, as the
 name implies, furnishes oily material which
 serves as a hair conditioning and hair grooming
 aid in the case of the shampoo/hair conditioning
 formulations and serves as a skin softener or
 40 emollient in the case of the bubble bath/bath
 oil compositions.

The plural-layer physical state of the com-
 layer physical state of the compositions enables
 the user to recognize the presence in the com-
 positions of the oil component thereof. 65

Although the compositions exist in the
 form of separate layers, they are shaken prior
 to use whereupon they form oil-in-water emul-
 sions which are only temporary due to the emul-
 sion destabilizer therein. This emulsion state 70
 enables the user to measure out the requisite
 amount of the composite compositions each
 time the products are used.

The actual time required for the composition
 to return to a layered state will be dependent 75
 on the actual formulation, but will generally be
 within 12 hours (although it may take longer
 for clarity of the layers to be obtained). Some
 of the formulations described herein separate 80
 quite quickly, and substantial separation into
 the original layered condition may sometimes
 be achieved within about half-an-hour.

In order that the compositions will have the
 desirable properties mentioned above, it is

SEE ERRATA SLIP ATTACHED

essential that they contain four ingredients, namely a water-immiscible oily material to provide an oily layer, and an organic detergent, an emulsion destabilizer and water to provide an aqueous layer. The nature and amounts of these essential ingredients are discussed below. It will be appreciated that the amounts are dependent upon the nature of the particular ingredients present as well as upon the nature or use for the composition, e.g., as a composite bubble bath/bath oil or as a composite shampoo/hair conditioner.

The compositions preferably contain at least 5% by weight of one or more water-immiscible oily materials. Although in certain cases amounts up to 65% may be used, the amount of oily material usually will not be more than 50%. In the composite shampoo/hair conditioning compositions the amount of oily material is desirably from 5% to 20% by weight, while in the composite bubble bath/bath oil compositions the amount of oily material will usually be at least 18% by weight. The oily material serves as a skin softener or emollient and as a hair conditioner or hair grooming aid.

Typical suitable oily materials include light to heavy mineral or hydrocarbon oils, such as the light mineral oils having a Saybolt viscosity of 65—75 cps. at 38°C. and a specific gravity of 0.835 to 0.845 at 15.5°C.; animal and vegetable oils, such as linseed oil, castor oil, olive oil, cottonseed oil, safflower oil, almond oil, peanut oil, coconut oil, coconut oil fractions, cornoil, sesame oil, and brominated vegetable oils; synthetic oils which are fatty acid alkyl esters containing a total of from 16 to 22 carbon atoms, such as isopropyl myristate, isopropyl palmitate and isopropyl stearate; and lanolin compounds, such as the well-known lanolin esters and lanolin alcohols. One of the preferred oily materials is mineral or hydrocarbon oil, because of the sharpness of the interface between such an oil layer and an aqueous layer. Highly unsaturated triglyceride oils such as linseed oil and safflower oil, and fatty acid alkyl esters give less sharpness of the interface when used as the sole oily material, although they enhance the foaming properties of the compositions when blended in varying amounts with other oily materials, such as mineral or hydrocarbon oil. The final oily layer should be liquid at room temperature, and preferably also at 0°C.

There is desirably present in the aqueous layer from 5% to 40%, preferably 5 to 30%, by weight of the foam-producing water-soluble organic detergent which functions as a cleansing and foaming agent. In the composite bubble bath/bath oil compositions the amount of the foaming organic detergent is preferably from 5% to 25% by weight, while in the composite shampoo/hair conditioning compositions the amount of the foaming organic detergent is preferably from 10% to 30% by weight.

The foam-producing organic detergent com-

prises one or more water-soluble non-cationic surface-active agents, i.e. an anionic, nonionic or amphoteric surfactant, or a mixture thereof, which produces acceptable foam or whose foam is supplemented by a suds improver. Preferred anionic detergents are sulfonated and sulfated anionic detergents and in particular the sodium, magnesium, ammonium, mono-di- and triethanolamine salts of sulfated fatty alcohols as well as these salts of the sulfonated alkylaryl compounds, all of which have a total of from 12 to 21 carbon atoms. Typical anionic detergents include sodium lauryl sulfate, sodium oleyl succinate, ammonium lauryl sulfosuccinate, sodium lauryl ether sulfate, ammonium lauryl sulfate, monoethanolamine lauryl sulfate, triethanolamine lauryl sulfate, sodium dodecylbenzene sulfonate, triethanolamine dodecylbenzene sulfonate and sodium N-lauroyl sarcosinate. Other anionic detergents include triethanolamine laurate-myristate and triethanolamine oleate.

Nonionic detergents include fatty acid alkanolamides and the alkylene oxide (ethylene oxide and propylene oxide) condensates of a hydrophobic base such as a long chain fatty alcohol, an alkylphenol, or a fatty acid alkanolamide. Typical of the fatty acid alkanolamides are those having a total of from 10 to 21 carbon atoms, such as lauric diethanolamide, coconut oil monoethanolamide and lauric isopropanolamide. The alkylene oxide condensates of long chain fatty alcohols include C_{10} to C_{21} fatty alcohols condensed with 3 to 20 moles of ethylene oxide, such as the ethylene oxide condensates of lauryl alcohol, myristyl alcohol and palmityl alcohol. The alkylene oxide condensates of alkylphenols include the alkylphenols having a C_8 to C_{15} alkyl group condensed with 3 to 20 moles of ethylene oxide, such as the octylphenol-8 mole ethylene oxide condensate, the nonyl phenol-10 mole ethylene oxide condensate and the dodecyl phenol-10 mole ethylene oxide condensate.

Amphoteric or ampholytic detergents include N-lauryl-N'-carboxymethyl-N'-(2-hydroxyethyl) ethylenediamine, coco-beta-alanine, and the Miranol compounds described in U.S. Patents Nos. 2,528,378 and 2,781,354.

While the compositions of the invention comprise a foam-producing water-soluble non-cationic organic detergent (usually amounting to 5 to 40% by weight of the composition), small amounts, such as up to about 0.5% by weight of the composition, of cationic surface-active agents can also be included in the composition when the organic detergent is based on non-ionic or amphoteric surface-active agents or mixtures thereof. Examples of cationics which can be included in minor proportion are cetyl trimethyl ammonium chloride and alkyl dimethyl benzyl ammonium chlorides.

An optional ingredient generally present as a part of the foaming organic detergent is a suds improver which is suitably utilized in the

- compositions in an amount from 2% to 15% by weight. When a suds improver is present, the amount of water-soluble non-cationic detergent will then generally be about 3% to about 25% by weight. Preferred suds improvers include tertiary amine oxides having one radical which is an alkyl radical of from 8 to 18 carbon atoms and two other radicals which are alkyl or hydroxyalkyl radicals having from 1 to 4 carbon atoms, such as dimethyl dodecyl amine oxide, dimethyl cocoamine oxide, dimethyl tetradecyl amine oxide, dimethyl hexadecyl amine oxide and bis(2-hydroxyethyl) cocoamine oxide. Further preferred suds improvers are: C_6 to C_{18} acyl amido-propyl-dimethyl-ammonium-acetic acid betaines, such as coconut oil fatty acyl and tallow oil fatty acyl amidopropyl-dimethyl-ammonium-acetic acid betaines; C_6 to C_{18} alkyl-dimethyl-ammonium acetic acid betaines, such as lauryl, myristyl, palmityl and stearyl-dimethyl-ammonium-acetic acid betaines; C_6 to C_{18} acyl dimethyl ammonium propane-sulfonic acid betaines, such as coconut oil fatty acyl and tallow oil fatty acyl dimethyl ammonium propane-sulfonic acid betaines; and C_6 to C_{18} alkyl dimethyl ammonium propane-sulfonic acid betaines, such as lauryl, myristyl, cetyl and stearyl dimethyl ammonium propane-sulfonic acid betaines. Other suitable suds improvers include fatty acid alkanolamines having a total of from 10 to 21 carbon atoms, such as lauric diethanolamide, coconut oil monoethanolamide and lauric isopropanolamide.
- A further essential ingredient of the compositions present in the aqueous layer is an emulsion destabilizer which is desirably employed in an amount of at least 5% by weight, preferably from 9% to 45% by weight. In general, the amount of emulsion destabilizer required will be related to the amount of organic detergent employed. Larger amounts of detergent may require the use of larger amounts of emulsion destabilizer to provide the desired temporary nature to the emulsion which is formed on shaking the composition. In the composite shampoo/hair conditioning compositions the amount of the emulsion destabilizer is from 5% to 28% by weight, while in the composite bubble bath/bath oil compositions the amount of the emulsion destabilizer is from 10% to 45%.
- The preferred emulsion destabilizer is an aliphatic monohydric alcohol having from 1 to 7 carbon atoms, such as methyl alcohol, ethyl alcohol, isopropyl alcohol, normal butyl alcohol, isobutyl alcohol, tertiary butyl alcohol, isoamyl alcohol, hexyl alcohol, and heptyl alcohol, and particularly ethyl alcohol and isopropyl alcohol. Other suitable emulsion destabilizers include the aliphatic dihydric alcohols having from 2 to 7 carbon atoms, such as ethylene glycol, propylene glycol and hexylene glycol; the monoalkyl ethers of aliphatic dihydric alcohols having a total of from 3 to about 6 carbon atoms, such as 2-methoxy, 2-ethoxy and 2-butoxy ethanol; benzyl and phenylethyl alcohols; and dialkyl ketones having a total of from 3 to 5 carbon atoms, such as dimethyl ketone or acetone, methyl ethyl ketone and diethyl ketone.
- While the compositions of the invention contain the above-mentioned ingredients, other compatible adjuvants can also be included therein. Thus the composition may, for example, contain one or more of the following: a perfume or essential oil; an oil-soluble or water-soluble dye; an oil-soluble or water-soluble germicide; a water-soluble silicone; polyvinyl alcohol; a protein hydrolysate; or a water-soluble salt, for example sodium chloride or monoethanolamine hydrochloride.
- The compositions of the invention can be prepared merely by blending together the various ingredients. Usually the ingredients required to form the aqueous component of the composition will be blended together separately, and then mixed with the ingredient or mixture of ingredients which is to constitute the oily component of the composition.
- As pointed out above, the detergent compositions of the invention are shaken prior to use to form a temporary oil-in water-emulsion. An acceptable usage amount of the composite bubble bath/bath oil compositions is approximately 1 gram per 3 litres of bath tub water, while a typical usage amount of the composite shampoo/hair conditioning compositions is approximately from 7 to 30 grams per shampooing.
- The following Examples illustrate the invention. Each composition comprises one oily layer and one aqueous layer, the oily layer being the upper layer. In Table I, Examples 1 and 2 are illustrative of bubble bath/bath oil compositions and Examples 3 to 8 are illustrative of shampoo/hair conditioner compositions.

TABLE I

Ingredients	Example No.	Percent by Weight							
		1	2	3	4	5	6	7	8
Triethanolamine Lauryl Sulfate	12	12	12	18.6	18.6	18.0	—	—	—
Monothanolamine Lauryl Sulfate	—	—	—	—	—	—	5.5	11	5.5
Sodium Dodecylbenzene Sulfonate	—	—	—	—	—	—	—	—	6.0
Sodium N-lauroyl Sarcosinate	—	—	—	—	—	—	6.0	—	—
N-Lauryl-N'-Carboxymethyl-N'-(2-hydroxyethyl) Ethylenediamine	—	—	—	—	—	—	6.0	6	6.0
Dodecyl(dimethyl Amine Oxide	3	3	—	4.5	—	—	3.0	3	3.0
Bis-(2-hydroxyethyl) Cocoamine Oxide	—	—	3	—	4.5	4.5	—	—	—
Isopropyl Alcohol	—	—	—	—	—	—	15.0	15	15.0
Ethyl Alcohol	20	20	20	18.0	18.0	18.0	—	—	—
Light Mineral Oil	38	38	38	9.5	9.5	15.0	15.0	15	15.0
Olive Oil	—	—	—	5.0	5.0	—	—	—	—
Unsaturated Hydroxyester from Castor Oil and Lanolin (Riclin C)	—	—	—	0.5	0.5	—	—	—	—
Perfume	2	2	2	—	—	—	2.0	2	2.0
Water	25	25	25	43.9	43.9	44.5	47.5	48	47.5
Total	100	100	100	100.0	100.0	100.0	100.0	100	100.0

Further examples of bubble bath/bath oil compositions in accordance with the invention are set forth in Tables II to V below.

TABLE II

Ingredients	Example No.	Percent by Weight	
		9	10
Nonylphenol 10 mole Ethylene Oxide Condensate		12	—
Lauric Diethanolamide		—	10
Bis-(2-hydroxyethyl) Cocoamine Oxide		3	—
Ethyl Alcohol		20	20
Light Mineral Oil		38	38
Perfume		2	2
Water		25	30
	Total	100	100

TABLE III

Ingredients	Example No.	Percent by Weight					
		11	12	13	14	15	16
Triethanolamine Lauryl Sulphate		16	19	12	12	12	20
Bis(2-hydroxyethyl) Cocoamine oxide		3	3	3	3	3	4
Ethyl Alcohol		10	10	20	20	20	19
Light Mineral Oil		14	16	—	—	—	11
Cottonseed Oil		14	16	—	—	—	—
Isopropyl Stearate		—	—	38	—	—	11
Olive Oil		—	—	—	38	—	—
Acetulan (Acetylated lanolin fraction)		—	—	—	—	38	—
Perfume		2	2	2	2	2	2
Water		41	34	25	25	25	33
	Total	100	100	100	100	100	100

TABLE IV

Ingredients	Example No.	Percent by Weight											
		17	18	19	20	21	22	23	24	25	26	27	28
Ammonium Lauryl Sulfosuccinate	19	—	—	—	—	—	—	—	—	—	—	—	—
Sodium Lauryl Sulfate	—	12	12	—	—	—	9	—	—	—	—	—	—
Sodium Lauryl Ether Sulphate <i>a</i>	—	—	—	—	12	12	—	—	—	—	—	—	—
Triethanolamine Lauryl Sulfate	—	—	—	—	—	—	—	3	6	8	10	12	15
Bis-(2-hydroxyethyl) Cocoamine Oxide	—	3	—	—	3	3	—	3	3	3	3	3	—
Lauric Diethanolamide	—	—	—	10	—	—	10	—	—	—	—	—	—
Ethyl Alcohol	20	20	20	20	10	20	20	40	30	25	15	10	12
Light Mineral Oil	18	38	38	38	28	38	38	38	38	38	38	38	38
Perfume	2	2	2	2	2	2	2	2	2	2	2	2	2
Water	41	25	18	45	—	35	21	14	21	24	32	35	33
Total	100	100	100	100	100	100	100	100	100	100	100	100	100

a Sodium salt of sulfate condensate of about 3 moles of ethylene oxide per mole of mixed alcohols derived from coconut oil.

TABLE V

Ingredients	Example No.	Percent by Weight
		29
Miranol 2MCA Modified (Dicarboxylic Coconut Derivative)		9
Bis-(2-hydroxyethyl)Cocoamine Oxide		3
Ethyl Alcohol		20
Light Mineral Oil		38
Perfume		2
Water		28
Total		100

Further examples of the shampoo/hair condition compositions of the invention are set forth in Tables VI and VIII below.

TABLE VI

Ingredients	Example No.	Percent by Weight				
		30	31	32	33	34
Lauric-myristic acid		7.8	—	—	—	—
Oleic Acid		8.7	—	—	—	—
Triethanolamine		10.0	—	—	—	—
Triethanolamine Lauryl sulfate		—	15.0	18.0	18.0	17.0
Ammonium Lauryl Sulfate		—	3.0	—	—	—
Bis-(2-hydroxyethyl) Cocoamine Oxide		—	4.5	4.5	4.5	4.2
Ethyl Alcohol		24.0	18.0	18.0	18.0	28.0
Light Mineral Oil		6.4	9.5	—	9.5	15.0
Olive Oil		3.3	5.0	—	5.0	—
Fractionated Coconut Oil (Neobee 0)		—	—	15.0	—	—
Lanolin Alcohol Ester (Ricilan C)		0.3	0.5	—	0.5	—
Protein Hydrolysate		—	—	—	1.0	—
Water		39.5	44.5	44.5	43.5	35.8
Total		100.0	100.0	100.0	100.0	100.0

TABLE VII

Ingredients	Example No.	Percent by Weight		
		35	36	37
Triethanolamine Lauryl Sulfate		18.6	18.6	18.6
Coconut Oil Fatty Alkyl Dimethyl Ammonium Propane-sulfonic Acid Betaine (Sulfobetaine DCH)		4.5	4.5	—
Coconut Oil Fatty Acyl Amidopropyl Dimethyl Ammonium Acetic Acid Betaine		—	—	4.5
Ethyl Alcohol		18.0	18.0	18.0
Light Mineral Oil		9.5	10.0	9.5
Olive Oil		5.0	—	5.0
Corn Oil (Degummed)		—	5.0	—
Lanolin Alcohol Ester		0.5	—	0.5
Protein Hydrolysate		—	1.0	—
Sodium Chloride		—	1.0	—
Perfume		0.5	0.5	0.5
Water		43.4	41.4	43.4
Total		100.0	100.0	100.0

TABLE VIII

Ingredients	Example No.	Percent by Weight
		38
Ammonium Lauryl Sulfate		18
Bis-(2-hydroxyethyl) Cocoamine Oxide		3
Hexylene Glycol		15
Mineral Oil		15
Water		49
Total		100

The plural-layer physical state of the liquid detergent compositions of the invention is critical as noted above.

In comparative tests that have been carried out it has been shown that only from oil-containing shampoos in which the oil is present as a distinct layer is sufficient oil deposited to provide hair conditioning.

In one experiment, the amount of oil deposited on hair from a typical shampoo composition in accordance with this invention containing 10% mineral oil, was compared with a similar product also containing 10% oil but in which the oil was solubilised so that it consisted of one layer only. Hair switches were treated with these products as follows. The hair was first wetted under the tap and allowed to drip-dry for 30 seconds. The hair switches were then agitated for 90 seconds in the compositions, which compositions were used in an amount of about 10% by weight of the hair sample. The hair was then rinsed and allowed to dry at room temperature overnight. The amount of oil deposited on the hair was then determined. The amount of oil deposited from the composition of the invention was found to be 0.11% by weight of the hair (i.e. based on 10 grams of hair the amount of oily material deposited was 0.011 grams) whereas the other product not containing the oil as a separate layer deposited only 0.03% of oily material on the hair.

In a similar experiment in which a product of the invention was used containing 15% by weight of mineral oil, the amount of oil deposited on the hair was substantially the same as from the product of the invention containing 10% by weight of oil.

In another experiment which was carried out, the effect on hair manageability of three shampoo products were compared.

Product A was a typical shampoo according to the invention containing 15% mineral oil.

Product B was a product similar to Product A but in Product B the mineral oil was solubilised so that this product had no separate oily layer.

Product C was similar to Product A but contained no mineral oil.

10 gram hair switches were wetted, shampooed with the above products, rinsed and then allowed to stand to dry in air. The ease with which the switches could be combed was then compared. It was found that there was no significant difference in the ease of combing between switches shampooed with Product B and those shampooed with Product C. On the other hand, switches which had been shampooed with Product A were significantly easier to comb than those treated with either of the other two products.

WHAT WE CLAIM IS:—

1. A liquid detergent composition having an aqueous layer and a layer of a liquid water-immiscible oily material which composition, when shaken, forms a temporary oil-in-water

emulsion, the aqueous layer comprising a foam-producing water-soluble non-cationic organic detergent, an emulsion destabiliser and water.

2. A composition as claimed in Claim 1, wherein the composition comprises at least 5% by weight of the oily material.

3. A composition as claimed in Claim 2, wherein the composition comprises from 5 to 65% by weight of the oily material; from 5 to 40% by weight of the organic detergent; and from 9 to 45% by weight of the emulsion destabiliser.

4. A composition as claimed in Claim 3, wherein the composition comprises from 5 to 20% by weight of the oily material; from 10 to 30% by weight of the organic detergent; and from 5 to 28% by weight of the emulsion destabiliser.

5. A composition as claimed in Claim 3, wherein the composition comprises from 18 to 65% by weight of the oily material; from 5 to 25% by weight of the organic detergent; and from 10 to 45% by weight of the emulsion destabiliser.

6. A composition as claimed in any of the preceding claims, wherein the oily material is a mineral oil.

7. A composition as claimed in any of the preceding claims, wherein the organic detergent is an anionic detergent.

8. A composition as claimed in Claim 7, wherein the anionic detergent is a sulfonated or sulfated anionic detergent.

9. A composition as claimed in any of the preceding claims, wherein the emulsion destabiliser is an aliphatic monohydric alcohol having 1 to 7 carbon atoms or an aliphatic dihydric alcohol having from 2 to 7 carbon atoms.

10. A composition as claimed in Claim 9, wherein the emulsion destabiliser is ethyl alcohol, isopropyl alcohol or hexylene glycol.

11. A composition as claimed in any of the preceding claims, wherein the organic detergent includes a suds improver.

12. A composition as claimed in Claim 11, wherein the amount of the suds improver is 2 to 15% by weight of the composition.

13. A composition as claimed in Claim 11 or 12, wherein the suds improver is a tertiary amine oxide of which one radical is an alkyl radical having 8 to 18 carbon atoms and the other two radicals are alkyl or hydroxy alkyl radicals having 1 to 4 carbon atoms, or a fatty acid alkanolamide having a total of 10 to 21 carbon atoms.

14. A composition as claimed in any of the preceding claims, comprising one oily layer and one aqueous layer.

15. A composition as claimed in any of the preceding claims, wherein the layer of the oily material is the uppermost layer.

16. A liquid detergent composition substantially as herein described with reference to any of the Examples 1 to 37.

17. A liquid detergent composition substantially as herein described with reference to Example 38.

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